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UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 720

Contribution from the Bureau of Biological Survey
E. W. NELSON, Chief

Washington, D. C. PROFESSIONAL PAPER December 23, 1918

FOOD HABITS OF THE MALLARD DUCKS OF THE UNITED STATES

By

W. L. McATEE, Assistant Biologist

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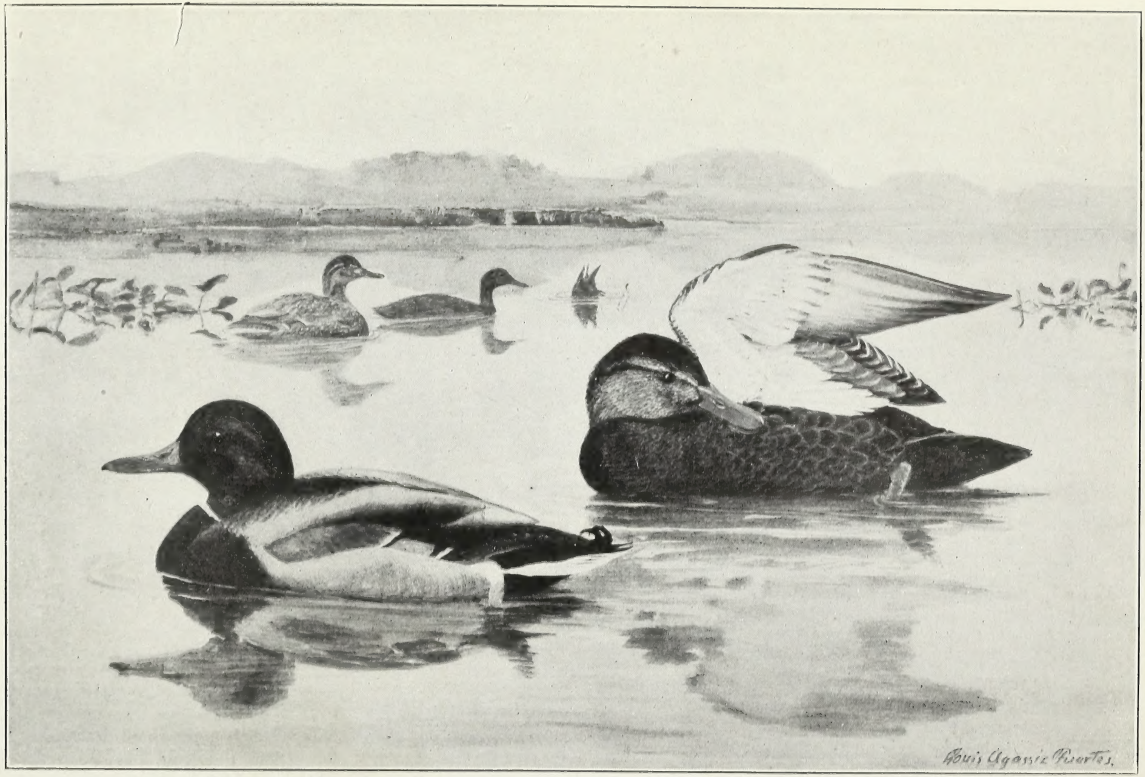

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MALLARD AND BLACK DUCKS.

Lower figures, males; upper, females.

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INTRODUCTION.

A knowledge of the natural feeding habits of mallard ducks is of value in connection with the propagation of the species in a semi-domesticated condition, as these ducks are used more commonly for this purpose than are any others. It is especially useful also in relation to the improvement of bodies of water and marshes as feeding grounds for wild ducks.[1]

The wild ducks ordinarily occurring within the United States are at present considered to represent 39 species, distributed among 22 genera. They are divided into three groups: The mergansers (Merginæ), known also as fish ducks, or sawbills; the river ducks (Anatinæ), also called shoal-water, puddle, or tipping ducks; and the sea ducks (Fuligulinæ), also called deep-water, or diving ducks. Although food preferences vary in each of these groups, those of the mallards are fairly representative of their group—the river ducks. The mallard genus, *Anas*, comprises three species which are among

[1] For specific information on this topic see Bull. 205, U. S. Dept. Agr., Eleven Important Wild-Duck Foods, in which are discussed musk grass, duckweeds, frogbit, thalia, water elm, swamp privet, eelgrass, widgeon-grass, watercress, waterweed, and coontail: pp. 25, figs. 23, May 20, 1915; also Bull. 465, Propagation of Wild-Duck Foods, in which are discussed wild rice, wild celery, pondweeds, delta potato, wapato, chufa, wild millet, and banana waterlily; pp. 40, figs 35, February 23, 1917.

NOTE.—This bulletin presents a technical study of the food habits of three species of mallard ducks: The mallard, the black duck, and the southern black duck. The vegetable food preferences exhibited will serve as a guide to certain wild-duck foods that may be propagated when it is sought to increase the numbers of these valuable game ducks, either in the wild state or in domestication.

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our most valuable game ducks and includes the most important single species—the common mallard (*Anas platyrhyncha*). The others are the dusky or black duck (*Anas rubripes*) and the southern black duck (*Anas fulvigula*).

These river ducks rarely dive so as to disappear entirely beneath the water, but obtain their food in shallows by dipping the head and neck or by submerging all of the body but the tipped-up tail. Vigorous paddling with the feet is needed to maintain the latter position in the water. The food usually is obtained within 12 to 16 inches of the surface, and as a result river ducks obtain fewer of the underground organs of aquatic plants than the diving ducks. These root systems of the plants include the rootstocks, stolons, tubers, and winter buds, which are stocked richly with nutriment. However, the river ducks wax fat by their own way of living, and although they are distinctly successful foragers, expediency seems to be their rule, as they are more nearly omnivorous than any other ducks.

MALLARD.

(*Anas platyrhyncha.*)

The mallard (see frontispiece) probably is the most abundant wild duck in the world, and its range covers the entire northern portion of the earth. Wherever it occurs it is popular and is usually the favorite waterfowl. Various races have claimed it for their own, and in consequence it has received such names as English duck and canard français (French duck). Other common names are wild duck, greenhead, gray mallard, and stock duck. The last name refers to the fact that the mallard is the source of most of the breeds of domesticated ducks. That it is possible under controlled conditions to produce mallards typically wild both in appearance and behavior has been taken advantage of on duck farms, where birds are reared both for market and sport.

The ease with which the mallard can be bred makes it the best species for wild-duck farming. This is an industry which should be developed as extensively as possible, in order to supplement the decreasing natural supply of game. The mallard is not only susceptible of great increase by game farming, but also may very easily be assisted to increase in the wild state. Its breeding range is so extensive that, at least in the northern half of the United States, where local conditions are suitable, strict protection throughout the spring almost certainly will induce it to nest.

Its beauty and popularity, hardiness, adaptability, and fecundity fit the mallard as no other duck is fitted to be the game duck of the future. Upon it should be centered a large share of the interest in duck farming and wild-fowl protection. Whatever is learned about

increasing the numbers of the mallard and whatever is done to protect and preserve it undoubtedly will prove of benefit to many other species of wild ducks.

FOOD HABITS.

A total of 1,725 gizzards of the mallard, many of them accompanied by well-filled gullets, have been examined. Twenty-five were collected in April, August, and September, but not being enough fairly to represent the food in these months were not tabulated. One hundred and forty-seven stomachs were examined [1] after ascertaining the percentages, which as quoted in the following pages are derived from analyses of the contents of 1,578 stomachs.

These were collected in 22 States and in 2 Canadian Provinces. Louisiana is much more heavily represented than any other State, with Arkansas, Wisconsin, Texas, and Florida next in rank in the order named. The over-representation of Louisiana and Arkansas tends to give undue importance to the duck foods common in those States. This is especially noticeable with regard to products of plants of cypress swamps.

Some of the stomachs of mallards were interesting on account of the large numbers of individual objects they contained. For instance, one collected at Hamburg, La., in February, revealed about 28,160 seeds of a bulrush (*Scirpus cubensis*), 8,700 of another sedge (*Cyperus ferax*), 35,840 of primrose willow (*Jussiæa* sp.), and about 2,560 duckweeds (*Lemna* sp.) as the principal items, a total of more than 75,200.

Another stomach collected at the same locality in December contained no fewer than 102,400 seeds of primrose willow (*Jussiæa leptocarpa*), besides a number of other items in smaller numbers. The seeds in this stomach if sowed one in a place and a foot apart each way would suffice for 2½ acres of ground.

About one-tenth (9.47 per cent) of the food of the mallard is derived from the animal kingdom and nine-tenths from the vegetable.

Vegetable Food.

Approximately nine-tenths (90.53 per cent) of the entire contents of the 1,578 mallard stomachs examined was derived from the vegetable kingdom. The largest proportion of the food drawn from any single family of plants came from the sedges and amounted to 21.62 per cent of the total. Grasses rank next in importance, supplying 13.39 per cent; then follow smartweeds, 9.83; pondweeds, 8.23; duckweeds, 6.01; coontail, 5.97; wild celery and its allies, 4.26; water elm and hackberries, 4.11; wapato and its allies, 3.54; and acorns 2.34 per cent. Numerous minor items make up the remainder.

[1] By E. G. Holt and D. C. Mabbott.

SEDGES (21.62 PER CENT).

Practically all the sedges contribute to the diet of the mallard. Their fruits, or akenes (the seeds with their immediately investing coats), are of most importance, although the stems, leaves, rootstocks, and tubers also are eaten. Seeds or other parts of bulrushes were found in the greatest number of stomachs. Unidentified bulrush seeds occurred in 540 gizzards, from 400 to 1,200 in some. The akenes of river bulrush (*Scirpus fluviatilis*) were identified in 45 stomachs, and those of *Scirpus cubensis* in 286. No fewer than 28,160 akenes of the latter species were obtained from the crop and gizzard of a single mallard. Akenes of sedges of the genus *Fimbristylis* occurred in 279 stomachs, the largest number in any one being 1,000. Eighty-seven hundred seeds of a *Cyperus* were taken from a single gizzard; tubers of these sedges also were found. Saw grass (*Cladium*) is rather important among the sedges fed upon by the mallard, and its seeds were identified in 246 stomachs, 1,100 being the largest number found.

GRASSES (13.39 PER CENT).

Wild rice (*Zizania aquatica*) is the most important of the grasses fed upon by the mallard. The value of this plant as a duck food is not exaggerated in popular opinion, and it is unfortunate that the plant is almost as erratic and disappointing in its responses to attempts at propagation as it is valuable as a duck food in the places it chooses to grow. Wild rice was found in 91 of the stomachs examined for this report, and no fewer than 1,200 to 2,400 kernels had been devoured by single birds. The kernels are sometimes taken in sprouting condition, and the leaves of the plant occasionally are eaten.

Among the more important of other wild grasses represented in the diet are: Wild millet (*Echinochloa crus-galli*), switch and crab grasses (*Panicum*), rice cut grass (*Homalocenchrus*), salt-marsh grass (*Spartina*), and white marsh or cut grass (*Zizaniopsis*).

Grain, which is largely produced by plants of the grass family, may best be considered in the present connection. Oats, corn, barley, wheat, buckwheat, and rice were found and together constitute 2.99 per cent of the total food. Rice only was certainly gleaned by the birds from cultivated fields and all of it was waste. Mallards eagerly feed on rice in the shock when opportunity occurs. Thus in 1917, when various factors delayed harvesting until the arrival of wild ducks from the north, mallards destroyed about $35,000 worth of rice in the vicinity of De Witt and Stuttgart, Ark. Probably all the other grains found in the stomachs of the birds examined were put out as bait for the birds. This is not to say that mallards do not feed in grain fields, for they are well known to do so.

For instance, Kumlien and Hollister[1] state that large numbers of mallards wintering on the prairies of Wisconsin feed chiefly in the cornfields. In Manitoba[2] they are said to feed in wheat and barley stubble, rapidly becoming fat. It has been said that mallards at times are destructive to sprouting grain, but this is hardly true. Even if mallards did feed extensively upon sprouting grain, little if any harm would result, as they would only nip off the leaves, not dig up the grain.

SMARTWEEDS (9.83 PER CENT).

The seeds of smartweeds are produced abundantly in wet situations. Well filled with nutritious material, it is no wonder they are a favorite with wild ducks. The seeds of 13 species of smartweeds have been identified from stomachs of the mallard, besides buckwheat, *Brunnichia*, and dock, which belong to the same family. A mallard collected at a locality where buckwheat was used for bait had about 750 of the large akenes in its crop and gizzard. A smartweed with a prickly four-angled stem and arrow-shaped leaves (*Polygonum sagittatum*) is a favorite with mallards. Its seeds were identified in 107 stomachs, as many as 2,000 being found in one. No fewer than 4,500 seeds of the water pepper (*Polygonum hydropiper*) were taken from the crop and gizzard of another mallard.

PONDWEEDS (8.23 PER CENT).

The pondweed family is important to almost all ducks. These submerged plants are abundant and widespread, usually produce a good crop of seeds, and often have fleshy rootstocks and foliage which are wholly edible. Seeds of pondweeds, not further identified, were found in 431 mallard stomachs, up to 560 in number in a single instance. Remains of six species of the genus *Potamogeton* were found during the analyses. The most important species for the mallard as well as for other ducks is the sago pondweed (*Potamogeton pectinatus*), of which stems, foliage, seeds, rootstocks, and tubers all were eaten. Among other plants of this family, widgeon-grass (*Ruppia maritima*) was found in 72 gizzards and bushy pondweed (*Naias flexilis*) in 67. No fewer than 5,500 seeds of eelgrass (*Zostera marina*), a salt-water representative of the family, were found in a single mallard's stomach.

DUCKWEEDS (6.01 PER CENT) AND COONTAIL (5.97 PER CENT).

Duckweeds (*Lemnaceæ*) thickly cover the surface of the water in southern swamps, and coontail (*Ceratophyllum demersum*) fills the water beneath. Both contribute materially to the subsistence of

[1] Bull. Wisconsin Nat. Hist. Soc., III, Nos. 1–3, p. 17, 1903.
[2] Proc. U. S. Nat. Mus., XIII, 1890, p. 476.

mallards frequenting their home. The former were found in about 300 of the mallard stomachs examined, and there were thousands in some of them. Coontail was found in 669 stomachs. The leaves of the plant as well as the seeds are eaten. The largest number of seeds found in any one gizzard was 150.

WILD CELERY AND ITS ALLIES (4.26 PER CENT).

Wild celery (*Vallisneria spiralis*) is well known for its value as a wild-duck food. It is most important to the diving ducks, which are able to feed on the rootstocks and buds, but shoalwater ducks occasionally obtain these parts of the plant and in the proper season can feed at will on the leaves. Thirty-eight of the mallards examined had fed on wild celery and 135 upon the seeds of a related plant, frogbit (*Limnobium spongia*). Another plant of the same family, waterweed (*Philotria*), was found in small quantity in only two stomachs.

WAPATO AND ITS ALLIES (3.54 PER CENT).

Wapato belongs to the family of arrowheads, many of which have large and nutritious tubers. The mallard is not particularly adapted to get food requiring such strenuous digging, but nevertheless manages to obtain a share of the coveted tubers where they are abundant. From 6 to 8 tubers of the delta potato (*Sagittaria platyphylla*) were taken at a single meal by some of the birds, as were no fewer than 11 tubers of another species of *Sagittaria*. Tubers, stems, and seeds of *Sagittaria* were found in more than a hundred stomachs, and seeds of the related water plantain (*Alisma*) in three.

SEEDS OF TREES AND SHRUBS.

Where trees and shrubs bearing nutritious fruits are so situated that their products fall into the water, they sometimes become an important source of wild-duck food. Those most important to the mallard are trees of the elm and oak families. The water elm (*Planera aquatica*), a common tree of southern swamps, has large nutritious seeds which remain for months in a perfect state of preservation in the water into which they fall. There they are found and eagerly devoured by wild ducks. One hundred and fifty-nine of the mallards examined had fed upon these seeds, no fewer than 200 of them being taken by a single duck. The seeds of hackberry (*Celtis*), a tree also of the elm family, were found in 46 stomachs; and altogether seeds of plants of this family compose 4.11 per cent of the total food of the mallards examined.

The next largest item of mallard food produced by trees is acorns. These were found in 37 stomachs and form 2.34 per cent of the whole subsistence. Mallards sometimes resort in flocks to woods where

they can obtain acorns, and occasionally a bird takes so many that it is unable to fly. In connection with acorns it is appropriate to mention hickory nuts, contained in 96 mallard gizzards. These hard nuts might be thought beyond the powers of a duck to digest, but, on the contrary, they are taken care of with ease, being broken by the great pressure exerted by the gizzard as they are on the point of entering that organ. Once wholly within they quickly are ground to fine fragments.

Seeds of buttonbush (*Cephalanthus occidentalis*), a crooked, stiff-branched shrub of swamps, were taken from the gizzards of 428 mallards. Hundreds of them were present in some stomachs. They compose 1.76 per cent of the food. Buttonbush and the water elm find a congenial home in cypress swamps, and in these swamps tree-borne seeds, or mast, are an important element of duck food. The cypress itself contributes to this supply in two ways. The rounded cones or balls of the cypress after falling into the water separate into their constituent scales, which are of a size convenient for ducks to swallow. Such scales were found in 113 of the mallard stomachs examined. On the twigs and leaves of cypress grow a number of kinds of galls. These are deformations of the plant caused by the deposition of gallfly eggs and the subsequent feeding and growth of the larvæ. Some of those on cypresses are beautiful both in shape and color, simulating flowers. They were eaten by 60 of the ducks examined and together with cypress scales or seeds compose 1.33 per cent of the total diet.

Among other noteworthy articles of food derived from woody plants are grape seeds, found in 339 stomachs, those of redhaws in 184, poison ivy in 96, hollies in 80, the climbing bamboo vine, supple jack, or black jack in 60, dogwoods in 51, willow capsules in 32, *Styrax* in 30, bayberries in 35, swamp privet in 26, and tupelo or swamp gum in 24.

MISCELLANEOUS VEGETABLE FOOD.

Additional items of vegetable food that deserve special mention are the waterlilies, waterpennies, and heliotrope. Of the waterlilies, seeds of water shield (*Brasenia*) were found in 70 stomachs, and of the floating waterlilies (*Castalia*) in 27. All the waterlilies together constitute a little less than 1 per cent of the food. Seeds of waterpenny (*Hydrocotyle*) were taken from 226 gizzards and make up 1.39 per cent of the subsistence. Seeds of a heliotrope (*Heliotropium indicum*), a plant introduced from India, are a curious item found in a large number (104) of mallard stomachs. On the average, however, they form but a slight percentage of the food.

Other plant foods of interest and of some importance are algæ, including musk grass (*Chara*); seeds of pickerel weed (*Pontederia*

cordata); of thalia, a plant related to the cannas; of saltbush, water crowfoots, water milfoil, and mermaid weed; water hemlock; and of Spanish needle, or bur marigold.

Animal Food.

The animal food of the mallard duck though extremely varied may be classed in five main groups: Insects, which constitute 2.67 per cent of the total diet; crustaceans, 0.35; mollusks, 5.73; fishes, 0.47; and miscellaneous, 0.25 per cent.

Insects (2.67 per cent).

The mallard's attentions to insects are divided about equally among beetles, bugs, and dragonflies, which together constitute 1.4 per cent of the total diet. All other insects make up 1.27 per cent. As would be expected, the beetles eaten are mostly denizens of the water. They include among others both larvæ and adults of the crawling water beetles (Haliplidæ), small spotted beetles, most often seen among algæ and other aquatic plants. Twenty different kinds of predacious diving beetles (Dytiscidæ) also were identified, both adults and larvæ being taken. The latter, so voracious that they have earned the name water tigers, are very destructive to other water-dwelling creatures and are a pest in fish ponds. Two partly predacious groups, the water scavenger beetles (Hydrophilidæ) and the whirligig beetles (Gyrinidæ) also are preyed upon by the mallard.

Among other beetles included in the dietary are ground beetles (Carabidæ), which are chiefly useful; and leaf beetles (Chrysomelidæ) and weevils, which are injurious. Of the leaf beetles, a group (*Donacia*) occurring in the mallard's habitat, and naturally fed upon, live upon waterlilies. The adults rest on lily pads or skip about on the water surface; the larvæ live in tough cocoons on the lily stems, from which they secure both food and oxygen. One of the weevils identified in the food is the rice water weevil, a pest to cultivated rice.

The bugs (Hemiptera) eaten by the mallard are practically all aquatic forms. They include water boatmen (Corixidæ), hundreds of which have been found in a single stomach; back-swimmers (Notonectidæ), water scorpions (Nepidæ), giant water bugs (Belostomatidæ), creeping water bugs (Naucoridæ), and water striders (Veliidæ and Gerridæ). All these bugs are predacious, but whether they do more good than harm is a question, as many of them prey upon small fishes. Besides the Hemiptera already mentioned, a variety of other bugs occasionally are devoured by the mallard.

Dragonflies, or snake-feeders, are active and expert insects on the wing, but in the younger stages they live in the water, where many of them fall a prey to the mallard. No fewer than 100 dragonfly nymphs have been found in one mallard's gizzard, and from 30 to 40

in others. Adult dragonflies were found in only one stomach. These insects prey upon mosquitoes, but their nymphs destroy young fish also, so that on the whole they are of no pronounced economic benefit.

Most of the other insects eaten by the mallard are more or less aquatic in habits. For instance, the flies (Diptera) eaten are chiefly those having aquatic larvæ, and it is the larvæ that are usually obtained. These include craneflies, mosquitoes, gnats, horseflies, soldierflies and flowerflies. Seven adult mosquitoes (*Culex restuans*) were found in one mallard's gizzard. Dr. Samuel G. Dixon, Health Commissioner of Pennsylvania, commends the mosquito-destroying capacity of the mallard. He writes: [1]

> After trying the ability of fish to devour larvæ and pupæ of mosquitoes, with varied success, I built two dams near together on the same stream, so that each would have the same environment for the breeding of mosquitoes. Each covered nearly 1,400 square feet. In one twenty mallard ducks, *Anas platyrhyncha*, were permitted to feed, while the other was entirely protected from waterfowl, but well stocked with goldfish, *Carassius auratus*, variety *americanus*.
>
> The one in which the ducks fed was for several months entirely free from mosquitoes, while the pond protected from ducks and stocked with fish was swarming with young insects in different cycles of life.
>
> To the infested pond ten well-fed mallard ducks, *Anas platyrhyncha*, were then admitted, and as they entered the pond they were first attracted by the larval bactrachians, tadpoles. They, however, soon recognized the presence of larvæ and pupæ of the mosquito and immediately turned their attention to these, ravenously devouring them in preference to any other foodstuff present. At the end of 24 hours no pupæ were to be found and in 48 hours only a few small larvæ survived. The motion of the water, made by the ducks, of course drowned some of the insects—what proportion can not be estimated.
>
> For some years I have been using ducks to keep down mosquitoes in swamps that would have been very expensive to drain, but I never fully appreciated the high degree of efficiency of the duck as a destroyer of mosquito life until the foregoing test was made.

Mayflies, stoneflies, and caddisflies also are consumed, usually as larvæ. More than 200 caddisfly larvæ have been obtained from a single stomach. Caterpillars, including an aquatic form which lives in nests made of duckweed, occasionally are disclosed by stomach examination.

The other insects eaten include a few ants and other Hymenoptera, Orthoptera and their eggs, and bird lice (Mallophaga). The last-named undoubtedly are obtained from the bird's own body. That mallards at times feed extensively upon grasshoppers was observed particularly during outbreaks of the Rocky Mountain locust, when from 12 to 49 of these insects were found in various stomachs by Prof. Samuel Aughey.[2]

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[1] Journ. Amer. Med. Assn., LXIII, no. 14, p. 1203, Oct. 3, 1914.

[2] First Ann. Rept. U. S. Ent. Comm., Appendix II, p. 58, 1877.

According to W. Stanley Hanson, of Fort Myers, Fla., mallards are effective enemies of another pest of this group, namely, the mole cricket. He says:

> My flock of mallards have completely destroyed the mole crickets in my grounds. The ducks feed at night, when the little mole, so destructive in certain parts of Florida, is doing its work.

CRUSTACEANS (0.35 PER CENT).

Although a considerable variety of crustaceans are eaten by the mallard they do not form an important element of the diet. Crawfishes are of most interest among them on account of their destructive habits. They were eaten by 51 of the mallards examined, and from 4 to 6 specimens were found in some stomachs. Other crustaceans devoured by mallards include water fleas, sand fleas, sowbugs, fresh-water shrimps, and crabs.

MOLLUSKS (5.73 PER CENT).

Mollusks, the most important element of the animal food of the mallard, comprise three-fifths of this and 5.73 per cent of the total. Fresh-water snails are represented most numerously, no fewer than 50 sometimes being taken at a single meal. Small bivalves also are eaten and as many as 23 were found in a single stomach.

OTHER ANIMAL MATTER (0.72 PER CENT).

Among miscellaneous animal matter taken by the mallard, fishes, constituting a little less than half of 1 per cent of the total food, are most important. Remains of frogs were found in 19 stomachs. One record of especial interest relates to a duck collected in December, by J. A. Spurrell, at Wall Lake, Iowa. For two days before this was killed it had frequented a small patch of open water in a creek, caused by the water from a drain. The bird had eaten two crawfishes and two or more frogs, which it must have secured from the muddy bottom to which such animals retreat during the winter.

Other animals found in mallard stomachs were nematode worms, including the so-called hairworms; fresh-water bryozoans, marine worms, earthworms, water mites, and spiders.

Besides the foregoing items of animal food, the following are stated by various writers to contribute occasionally to the food of the mallard: Barnacles, leeches, snakes, mice, salmon eggs, and carrion, including dead salmon and other fishes.

BLACK DUCK.

(*Anas rubripes.*)

The black duck is a close relative of the mallard. In size and form the two species are practically identical, and in both the female has the same loud resonant quack that distinguishes the mallards

from all other ducks. The black duck differs radically from the mallard in coloration, however, and also is different from that species in having the sexes colored alike. In temperament, furthermore, the black duck varies considerably from its more abundant relative. It is wilder, seldom lapsing from an attitude of intense wariness; it appears keener in every way, and its senses of sight, hearing, and smell are constantly alert. It is, therefore, a gamier species than the mallard, and for the same reasons is not so susceptible to domestication. It is also distinctly more nocturnal in habit than the mallard.

Vernacular names for the species, other than the one commonly used, include dusky duck, black mallard, black stock duck, and canard noir.

Breeding from Virginia and Iowa north to Hudson Bay and Labrador, the black duck ranges in winter from Nova Scotia south to Florida and Louisiana, and casually to Colorado.[1] It is not distributed uniformly over this region, however, and the probabilities are that a large majority of the individuals winter in the Atlantic Coast States from New England to the Carolinas.

FOOD HABITS.

Unevenness in distribution results in the black duck's feeding more extensively than the mallard in salt marshes and other areas characteristic of the coast region. In such places animal food, as mollusks and crustaceans, is abundant and contributes more to the subsistence of ducks than is the case in inland waters. Accordingly, the black duck consumes almost three times as much animal food as the mallard. The actual percentages, contrasted, are, respectively, 24.09 and 9.47. Due to its habit of frequenting salt water, the black duck also devours far more eelgrass (*Zostera marina*) than the mallard. The total percentage of vegetable food is 75.91.

The number of black duck stomachs examined was 622. In tabulating the results 232 stomachs were excluded, as they were either nearly empty or were taken in poorly represented months. The statements as to percentages of food, therefore, are based on the contents of 390 stomachs collected in the six months from September to February. This material was obtained in 19 States and in 2 Canadian Provinces. The distribution both geographically and through the months is very satisfactory.

Vegetable Food.

Three-fourths (75.91 per cent) of the food of the black ducks examined consisted of vegetable matter, and fully half of this was derived from such submerged plants as the pondweeds, eelgrass, and

[1] Opinion is now almost unanimous that there are two forms of the black duck, a red-legged bird (*Anas rubripes rubripes*), occupying the whole northern and interior range of the species; and a dark-legged race (*A. r. tristis*), occurring along the Atlantic coast up to the Gulf of St. Lawrence.

wild celery. The pondweed group alone, including the ordinary pondweeds (*Potamogeton*), bushy pondweed (*Naias*), widgeon-grass (*Ruppia*), horned pondweed (*Zannichellia*), and eelgrass (*Zostera*), composed 32.34 per cent of the total diet. Leaves, stems, tubers, winter buds, and seeds of pondweeds are eaten, and 700 seeds were found in a single stomach. No fewer than 4,000 seeds of eelgrass were taken from the gizzard and gullet of one black duck. Wild celery is an important food plant, but as it was not tabulated separately, its percentage can not be stated.

Following the pondweed group in importance are the grasses and sedges, each contributing nearly 11 per cent to the diet of the black mallard. The most important grasses are salt-marsh grass (*Spartina*) and wild rice (*Zizania*). Some stomachs contained from 1,000 to 1,200 grains of wild rice. Cultivated rice was found in two gizzards, to the extent of 720 kernels in one. It was gleaned from fields already harvested. A notable part of the total percentage of grasses was made up of corn supplied to the ducks as bait. One bird had taken 227 kernels at a meal. Wheat, also used as a bait, was found in one stomach.

The sedges which supply most food to black ducks are the bulrushes (*Scirpus*). Mainly the seeds of these plants are devoured, and 2,000 have been found in one stomach. The tubers, as a rule, are sparingly eaten, but one species (*Scirpus pauciflorus*), common about the southern end of Hudson Bay, has a tender propagating bud which is eagerly eaten by ducks, and of which the black duck takes its share. Of other sedges, the following total numbers of seeds were taken from single stomachs: *Carex*, 320; twig rush (*Cladium*), 720; and *Fimbristylis*, 900. The stems, leaves, and rootstocks of sedges also are eaten occasionally.

Smartweeds are important to the black duck as also they are to many other wild fowl. Their seeds make up a twentieth of the food of this bird, and nine different species were identified; from 2,000 to 3,200 were found in individual stomachs, and in one the enormous total of 36,300.

Seeds of bur reeds (*Sparganium*), usually not a conspicuous element of wild-duck food, were found in 144 stomachs of black ducks, to the number of 200 to 250 in several. They make up 3.37 per cent of the diet. Algæ form a larger element of the food of the black duck than of most of its relatives. This is merely because the maritime habits of the bird give it access to seaweeds. Musk grasses (*Chara*), a fresh-water group, also were among the algæ eaten.

Other items of vegetable food worthy of mention are the seeds of water shield (*Brasenia*), waterlilies, and coontail (*Ceratophyllum*), which together form 1.36 per cent of the food; leaves, roots, and tubers of various wapatos; seeds of pickerel weed, and of grape and

mermaid weed. Items of especial interest, although of less importance, are huckleberries, of which more than 800 seeds were found in one stomach and 200 in another; seeds of a wake-robin, or trillium, of which one bird had devoured 523; of sea purslane, reaching a total of 800 in the single instance found; and of common ragweed, 900 of which had been consumed at a single meal. Seeds said by Nuttall to be taken by the black duck additional to the vegetable food revealed by these stomach examinations are of a bog plant, *Scheuchzeria palustris*.

Animal Food.

As usual, the animal food consists of a larger number of different items than the vegetable, although individually these are of very much less importance than the plants. In all, they compose 24.09 per cent of the total. A little over half of this, namely, 12.27 per cent, is made up of mollusks or shellfish. Both bivalve and univalve shells are eaten, but many more of the latter, in accordance with their greater abundance. Of the bivalves, the common blue mussel (*Mytilus edulis*) is most important. It was found in 35 stomachs, and to the number of 30 in a single instance. This shellfish is enormously abundant, and although used to some extent for food and fish bait, can not be said to have a value that renders the birds feeding upon it economically injurious.

Univalves were taken in all stages, including eggs. No fewer than 650 snails were found in one stomach and of univalves and bivalves together 1,200 were present in a single case. Shells of the genus *Litorina* are frequently taken, and five species were identified. A common introduced form, *L. rudis*, was found in 38 gizzards, in one to the number of 150 individuals.

Crustacea, including barnacles, sand fleas, water fleas, sowbugs, shrimps, crawfishes, and crabs, are next in importance to Mollusca in the animal food of the black duck. They compose 7.99 per cent of the total diet. Hundreds of the smaller kinds were present in some stomachs, as were also as many as 60 sowbugs and 30 crabs. In a single instance a specimen of the common edible crab (*Callinectes sapidus*) was identified.

The other items of the animal food that form noteworthy percentages are insects and fishes. The insects taken are largely aquatic beetles and bugs, but dragonflies, especially in their immature stages, earwigs, crickets, grasshoppers, caddisflies and their larvæ, two-winged flies, and ants also are taken. The rice water weevil was among the beetles eaten, 20 being found in one stomach. In all, insects amount to 1.89 per cent of the food. Fishes and their eggs were found in 20 stomachs and compose 1.34 per cent of the subsist-

ence. An eel and some killifishes (*Fundulus*), neither of particular food value, were identified, and the fish eggs eaten probably also were those of killifishes. Another item of animal food worthy of mention is marine worms of the genus *Nereis*. These were found in 17 stomachs, no fewer than 25 in one. These worms prey to some extent upon oysters and other shellfish.

Elements of the animal food of the black duck credibly reported by other observers [1] but not found during the present investigation are: angle-worms, the sand flea *Gammarus ornatus*, the isopod *Idotea marina*, and the snail *Campeloma decisa*.

Food of the Young.

Having gizzards from representatives of three different broods of black ducks allows brief discussion of the food habits of the young. As is the case with a majority of birds, the percentage of animal food taken by the young is much higher than by the adults. For the three broods examined it ranges from 40 to 79.25 per cent. The constituents of this part of the food are practically the same as those taken by adults with the exception of fish eggs. All of a 6-day-old brood of five black mallards taken on Wallops Island, Va., May 18, 1910, had eaten eggs of fishes, probably of the little killifishes so abundant in salt marshes. The food of a brood from James Bay, Canada, taken July 13, 1914, consisted on the average of 96 per cent caddis larvæ. The vegetable food of the young showed no peculiarities, except that possibly more odds and ends, rare items in the dietary, were picked up than would be by an equal number of adults. Such were seeds of marsh mallow (*Hibiscus*), cleavers (*Galium*), *Hypericum*, lamb's-quarters (*Chenopodium*), amaranth, *Lippia modiflora*, and rose. The Wallops Island brood mentioned made on the average 47 per cent of its food of algæ.

SOUTHERN BLACK DUCK.

(*Anas fulvigula.*)

The southern black duck inhabits peninsular Florida and a narrow strip of marsh and swamp land bordering the Gulf of Mexico from Florida to Texas. Usually it is considered to consist of two subspecies, the Florida duck (*Anas fulvigula fulvigula*), and the mottled duck (*A. f. maculosa*), the latter living in Louisiana and Texas. However, these are treated together here as the southern black duck. This is a smaller and lighter-colored bird than its northern relative and may be recognized by the plain creamy buff throat and foreneck. In the northern black duck these parts are streaked with dusky.

[1] This does not include the generalization of Audubon.

Besides the vernacular names already mentioned, the following are applied to this species: Summer duck, summer French duck, canard noir d'été, canard des isles, and Mexican mallard. In general, the habits of this species are much like those of the northern black mallard.

FOOD HABITS.

The fact that the black duck takes a notably larger proportion of animal food than the common mallard probably is due, as has been noted, simply to greater availability of this class of food to the black duck, as that species spends more time in coastal marshes, where animal food is more abundant and accessible through a longer season. The southern black duck, living in an area where cold weather is experienced only occasionally and for only short periods, has a better opportunity to get animal food than the black duck. It responds to this superior availability, which after all is the guiding principle in the choice of food by birds, by making 40.5 per cent of its diet of animal matter. This exceeds the proportion taken by the black duck by approximately 15 per cent, almost the same difference as between that species and the mallard.

Fifty-one stomachs of the southern black duck have been examined and analyses of 48 of them were used for the percentages. Although this is a rather small representation of the species, the stomachs are distributed fairly well through the six months from November to April and represent all the usual haunts of the species—the Everglades and the river marshes of Florida, the coast marshes of Louisiana, and the coastal lakes and lagoons of Texas. It is probable, therefore, that they afford a reasonably accurate idea of the feeding habits of this species.

Vegetable Food.

Grasses are the most important element of the vegetable food of the southern black duck, forming almost half of it. Frequently the rootstocks are dug up and devoured, and some stems and leaves are eaten. Of the grass seeds consumed, cultivated rice is most important. Most of that found in the stomachs was waste, being taken in winter, and as it included red rice, some good was done by eating it. However, as the southern black duck spends the summer in the country where much rice is grown, it has the opportunity of feeding upon the crop in the younger and more appetizing stages. It is said to do this sometimes to a destructive extent. However, the game value of the duck makes it undesirable to take aggressive measures against it on behalf of the rice crop. A toll large enough, if not too large, is taken of the birds during the hunting season.

Next to grasses the seeds of smartweeds are preferred. They form almost a tenth (9.54 per cent) of the total diet. No fewer than 800

seeds of prickly smartweed (*Polygonum sagittatum*) were taken from a single stomach. The seeds and tubers of sedges compose the next largest item, namely, 6.34 per cent. Seeds of waterlilies and coontail make up 3.11 per cent and seeds, stems, and foliage of pondweeds and widgeon-grass, 1.6 per cent. Other items of vegetable food worth mentioning are bayberries and seeds of buttonbush.

Animal Food.

As is true of both of its close relatives, the southern black duck consumes more mollusks than any other kind of animal food. These shellfish compose five-eighths of the animal diet and nearly 27 per cent of the whole food. Snails as large as one inch in diameter were among those eaten. Insects, making up less than a third as much of the food, are next in importance. Dragonfly nymphs, rarely adults, water bugs, caddis larvæ, a variety of beetles, and flies, including horsefly larvæ, are the principal items taken. Crustacea, chiefly crawfishes, contribute 2.77 per cent of the food, and fishes, no doubt small worthless kinds, 2.57 per cent.

Table I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found.*

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
Subkingdom **EUTHALLOPHYTA.**			
Unidentified algæ	21	31	.....
Chara sp. (musk grass)	29	2	.....
Fucus sp. (seaweed)	.....	3	.....
Subkingdom **BRYOPHYTA.**			
Ricciella sp. (floating liverwort)	4	.....	.....
Moss	1	.....	.....
Subkingdom **PTERIDOPHYTA.**			
Marsileaceæ.			
Marsilea vestita (pepperwort)	3	.....	.....
Marsilea sp. (pepperwort)	2	.....	.....
Equisetaceæ.			
Equisetum sp. (horsetail)	1	.....	.....
Subkingdom **SPERMATOPHYTA.**			
Pinaceæ.			
Pinus taeda (loblolly pine)	2	.....	.....
Pinus sp. (pine), needles	.....	2	.....
Picea sp. (spruce), needles	1	1	.....
Taxodium distichum (bald cypress)	113	1	.....
Taxodium distichum (bald cypress), galls	60	.....	.....
Sparganiaceæ.			
Sparganium androcladum (bur reed)	6	3	.....
Sparganium eurycarpum (bur reed)	25	2	.....
Sparganium sp. (bur reed)	116	139	.....

TABLE I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Potamogetonaceæ.			
Potamogeton lucens (shining pondweed)	3	.....	.....
Potamogeton prælongus (white-stemmed pondweed)	1	.....	.....
Potamogeton foliosus (leafy pondweed)	2	2	.....
Potamogeton friesii (Fries pondweed)	4	.....	.....
Potamogeton pusillus (small pondweed)	5	.....	.....
Potamogeton pectinatus (sago pondweed)	43	19	1
Potamogeton perfoliatus (redhead grass)	.....	1	.....
Potamogeton sp. (unidentified pondweed)	431	217	.....
Ruppia maritima (widgeon-grass)	85	101	4
Zannichellia palustris (horned pondweed)	10	2	.....
Zostera marina (eelgrass)	4	71	.....
Naiadaceæ.			
Naias flexilis (bushy pondweed)	75	32	1
Juncaginaceæ.			
Triglochin maritima (arrow-grass)	7	.....	.....
Alismaceæ.			
Echinodorus sp. (burhead)	1	.....	.....
Alisma plantago-aquatica (water plantain)	3	.....	.....
Alisma sp. (water plantain)	3	.....	.....
Sagittaria platyphylla (delta potato)	89	.....	.....
Sagittaria latifolia (wapato)	2	3	.....
Sagittaria teres (goose-grass)	.....	1	.....
Sagittaria graminea? (grass-leaved wapato)	.....	7	.....
Sagittaria sp. (arrowhead)	23	1	.....
Damasonium californicum	2	.....	.....
Hydrocharitaceæ.			
Philotria canadensis (waterweed)	2	.....	.....
Vallisneria spiralis (wild celery)	38	23	.....
Limnobium spongia (frogbit)	135	.....	.....
Gramineæ.			
Unidentified grasses	74	6	.....
Zea mays (Indian corn)	14	7	.....
Sorghum sp.	.....	1	.....
Paspalum distichum [1]	1	.....	.....
Paspalum sp.	8	.....	.....
Echinochloa crus-galli (wild millet)	69	4	2
Panicum sp. (switch grass)	68	13	2
Panicum dichotomiflorum (switch grass)	1	.....	.....
Chætochloa lutescens (yellow foxtail)	2	.....	.....
Chætochloa sp. (foxtail grass)	8	1	1
Cenchrus sp. (burgrass)	1	.....	.....
Zizaniopsis miliacea (cut grass)	41	2	.....
Zizania aquatica (wild rice)	91	29	.....
Homalocenchrus oryzoides (rice cut grass)	6	.....	.....
Homalocenchrus lenticularis (catch-fly grass)	2	.....	.....
Homalocenchrus virginicus (false rice)	4	.....	.....
Homalocenchrus sp. (unidentified cut grass)	13	1	1

[1] *Paspalum boscianum* and *Eriochloa punctata* also have been identified from a common mallard's stomach by L. H. Dewey.

TABLE I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Gramineæ—Continued.			
Oryza sativa (cultivated rice)	60	2	7
Avena sativa (cultivated oats)	3		
Danthonia sp. (oat grass)	1		
Spartina sp. (salt-marsh grass)	20	62	
Leptochloa floribunda (feather grass)	1		
Eragrostis sp. (love grass)	5		
Monanthochloë littoralis	7	5	1
Distichlis spicata (salt grass)	4		
Panicularia nervata (meadow grass)	12		
Poa sp. (meadow grass)		1	
Festuca brachyphylla (fescue grass)		1	
Bromus sp. (brome grass)	1		
Hordeum sativum (barley)	7		
Hordeum murinum (wild barley)	1		
Triticum æstivum (wheat)	1	1	
Cyperaceæ.			
Unidentified sedges	114	23	
Cyperus esculentus (chufa)	1	1	2
Cyperus ferax (chufa)	10		
Cyperus sp. (chufa)	48	5	1
Scirpus paludosus (prairie bulrush)	9		
Scirpus fluviatilis (river bulrush)	45	4	
Scirpus cubensis (bulrush)	286		
Scirpus americanus (three-square)	22		
Scirpus pauciflorus (club-rush)		3	
Scirpus sp. (unidentified bulrush)	540	194	6
Eleocharis sp. (spike-rush)	37	36	
Fimbristylis sp. (sedge)	279	25	3
Psilocarya nitens (bald rush)	3		
Psilocarya sp. (bald rush)	10		
Cladium effusum (saw grass)	239	8	16
Cladium mariscoides (twig rush)	7	27	
Rhynchospora corniculata (pollywog)	24	2	7
Rhynchospora sp. (beaked rush)	5		3
Dichromena sp.	6		
Scleria reticularis (nut rush)			1
Scleria torreyana (nut rush)			1
Scleria sp. (nut rush)	13		3
Carex decomposita (panicled sedge)	77		
Carex lupulina (hop sedge)	1		
Carex lupuliformis (hop sedge)	7		
Carex gigantea (hop sedge)	12		
Carex sp. (sedge)	28	50	
Araceæ.			
Peltandra virginica (hog wampee)			1
Lemnaceæ.			
Lemna minor (small duckweed)	10		
Lemna trisculca (star duckweed)	1		
Lemna sp. (unidentified duckweeds)	247	4	

TABLE I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Lemnaceæ—Continued.			
Spirodela polyrhiza (greater duckweed)	2		
Wolffia columbiana (water meal)	3		
Wolffia sp. (water meal)	66	1	
Eriocaulaceæ.			
Eriocaulon sp. (pipewort)		1	
Xyridaceæ.			
Xyris sp. (yellow-eyed grass)	1		
Commelinaceæ.			
Commelina sp. (dayflower)	1	1	
Pontederiaceæ.			
Pontederia cordata (pickerel weed)	31	11	2
Liliaceæ.			
Unidentified	2		
Convallariaceæ.			
Vagnera sp. (false Solomon's seal)		1	
Trilliaceæ.			
Trillium sp		1	
Smilaceæ.			
Smilax sp. (greenbriar)	6	2	2
Marantaceæ.			
Thalia divaricata	2		
Juglandaceæ.			
Hicoria aquatica (bitter pecan)	7		
Hicoria sp. (hickory)	89	2	
Myricaceæ.			
Myrica cerifera (bayberry)	5		16
Myrica carolinensis (bayberry)	1		
Myrica sp. (bayberry)	29	60	
Salicaceæ.			
Salix sp. (willow), leaves and capsules	32	1	
Betulaceæ.			
Carpinus caroliniana (hornbeam)	3		
Betula sp. (birch)	1		
Fagaceæ.			
Quercus alba (white oak)	1		
Quercus lyrata (overcup oak)	1		
Quercus sp. (unidentified oaks)	35	1	
Ulmaceæ.			
Planera aquatica (water elm)	159	1	
Celtis mississippiensis (hackberry)	3		
Celtis sp. (hackberry)	43		
Polygonaceæ.			
Rumex persicarioides (golden dock)	1		
Rumex sp. (dock)	10	2	
Polygonum amphibium (water smartweed)	117	2	1
Polygonum arifolium (prickly smartweed)	8	4	
Polygonum aviculare (knotweed)	13		
Polygonum convolvulus (climbing buckwheat)	3		
Polygonum dumetorum (climbing buckwheat)	1		
Polygonum hydropiper (water pepper)	137	11	

TABLE I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Polygonaceæ—Continued.			
Polygonum hydropiperoides (water pepper)	2	.....	.....
Polygonum lapathifolium (smartweed)	5	2	.....
Polygonum opelousanum (smartweed)	53	2	.....
Polygonum pennsylvanicum (smartweed)	8	3	.....
Polygonum persicaria (smartweed)	10	3	.....
Polygonum punctatum (smartweed)	2	2	.....
Polygonum sagittatum (prickly smartweed)	107	47	16
Polygonum sp. (unidentified smartweeds)	191	45	1
Fagopyrum esculentum (buckwheat)	5	.....	.....
Brunnichia cirrhosa	4	.....	.....
Amaranthaceæ.			
Amaranthus sp. (tumbleweed)	4	3	.....
Chenopodiaceæ.			
Chenopodium album (lamb's-quarters)	2	.....	.....
Chenopodium sp. (lamb's-quarters)	6	1	.....
Salsola kali (saltwort)	1	2	.....
Atriplex sp. (saltbush)	1	.....	.....
Salicornia ambigua (pickle grass)	4	.....	.....
Salicornia sp. (pickle grass)	.....	5	.....
Phytolaccaceæ.			
Phytolacca americana (pokeweed)	4	.....	.....
Rivina humilis	2	.....	.....
Portulacaceæ.			
Portulaca oleracea (purslane)	1	.....	.....
Aizoaceæ.			
Sesuvium maritimum (sea purslane)	.....	1	.....
Caryophyllaceæ.			
Unidentified chickweed	1	.....	.....
Arenaria sp. (sandwort)	.....	2	.....
Ranunculaceæ.			
Batrachium trichophyllum (white water-crowfoot)	1	.....	.....
Batrachium sp. (white water-crowfoot)	8	.....	.....
Ranunculus delphinifolius (yellow water-crowfoot)	10	.....	.....
Ranunculus missouriensis (yellow water-crowfoot)	8	.....	.....
Ranunculus sp. (crowfoot)	28	.....	.....
Ceratophyllaceæ.			
Ceratophyllum demersum (coontail)	669	12	1
Cabombaceæ.			
Brasenia schreberi (water shield)	70	33	1
Cabomba caroliniana (Carolina water shield)	1	.....	.....
Nymphæaceæ.			
Nymphæa advena (spatterdock)	3	.....	.....
Nymphæa americana (spatterdock)	.....	1	.....
Nymphæa polysepala (spatterdock)	5	.....	.....
Nymphæa sp. (spatterdock)	8	1	6
Castalia mexicana (banana waterlily)	13	.....	1
Castalia sp. (waterlily)	14	2	2
Unidentified waterlilies	8	.....	.....
Papaveraceæ.			
Papaver sp. (poppy)	1	.....	.....

TABLE 1.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Capparidaceæ.			
Cleome serrulata (three-leaved spider flower)	1		
Altingiaceæ.			
Liquidambar styraciflua (sweet gum)	19		
Platanaceæ.			
Platanus occidentalis (sycamore)	3		
Rosaceæ.			
Rosa sp. (rose)	3	2	
Rubus sp. (blackberry)	8	10	
Malaceæ.			
Cratægus sp. (red haw)	184	3	
Amygdalaceæ.			
Prunus virginiana (chokecherry)		3	
Prunus sp. (cherry)		11	
Cæsalpinaceæ.			
Cassia sp. (senna)	1		1
Fabaceæ.			
Trifolium sp. (clover)	13		
Medicago denticulata (bur clover)	2		
Lespedeza sp. (bush clover)	1		
Lespedeza striata (Japan clover)	1		
Strophostyles sp. (wild bean)	1		
Pisum sativum (cultivated pea)		1	
Unidentified	1		
Geraniaceæ.			
Geranium longipes	2		
Geranium sp.	2		
Rutaceæ.			
Citrus sinensis (cultivated orange)		1	
Euphorbiaceæ.			
Croton sp. (spurge)	37		
Euphorbia sp. (spurge)	1		
Callitrichaceæ.			
Callitriche sp. (water starwort)		1	
Empetraceæ.			
Empetrum nigrum (crowberry)		3	
Anacardiaceæ.			
Rhus glabra (smooth sumac)	2	4	
Rhus toxicodendron (poison ivy)	96	1	
Rhus sp. (unidentified sumac)	4	5	1
Aquifoliaceæ.			
Ilex vomitoria (youpon)	1		
Ilex decidua (swamp holly)	1		
Ilex verticillata (black alder)	1	4	
Ilex sp. (holly)	77	5	1
Sapindaceæ.			
Cardiospermum halicababum (balloon vine)	7		
Balsaminaceæ.			
Impatiens biflora (touch-me-not)		1	
Vitaceæ.			
Vitis sp. (grape)	339	8	1

TABLE I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Malvaceæ.			
Malva sp. (mallow)	2		
Sida sp. (nail grass)	6		
Hibiscus moscheutos (rose mallow)		1	
Hibiscus sp. (marsh mallow)	4	4	
Unidentified	2		
Hypericaceæ.			
Hypericum sp		1	
Passifloraceæ.			
Passiflora incarnata (passion flower)	1		
Cactaceæ:			
Opuntia sp. (prickly pear)	1		
Lythraceæ:			
Decodon verticillatus (willow herb)	15	1	
Onagraceæ:			
Jussiæa leptocarpa (primrose willow)	2		
Jussiæa sp. (primrose willow)	3		
Haloragidaceæ:			
Hippuris vulgaris (bottle brush)	47	1	
Proserpinaca pectinata (mermaid weed)	4		
Proserpinaca sp. (mermaid weed)	52	10	3
Myriophyllum heterophyllum (water milfoil)	2		
Myriophyllum sp. (water milfoil)	86	3	
Ammiaceæ:			
Hydrocotyle sp. (waterpenny)	226	3	
Centella asiatica (waterpenny)	4		1
Apium graveolens (celery)	2		
Cicuta sp. (water hemlock)	24		
Unidentified	1		
Cornaceæ:			
Cornus florida (flowering dogwood)	1		
Cornus nuttallii (flowering dogwood)	1		
Cornus alternifolia (dogwood)	1		
Cornus asperifolia (dogwood)	28		
Cornus occidentalis (dogwood)	2		
Cornus stolonifera (dogwood)	1	1	
Cornus sp. (dogwood)	17	2	
Berchemia volubilis (blackjack)	60		
Nyssa aquatica (tupelo)	22		
Nyssa sylvatica (sour gum)	17	2	
Nyssa sp. (tupelo)	2		
Fricaceæ:			
Ledum sp. (Labrador tea)	1		
Arctostaphylos sp. (kinnikinnik)	1		
Vacciniaceæ:			
Gaylussacia baccata (huckleberry)		2	
Gaylussacia sp. (huckleberry)		1	
Vaccinium sp. (blueberry)		1	
Primulaceæ:			
Anagallis arvensis (pimpernel)	2		
Ebenaceæ:			
Diospyros virginiana (persimmon)	1		

TABLE I.—*Items of vegetable food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **SPERMATOPHYTA**—Continued.			
Styracaceæ:			
Styrax americana (smooth storax)	1		
Styrax pulverulenta (downy storax)	1		
Styrax sp. (storax)	28		
Oleaceæ:			
Fraxinus sp. (ash)	4		
Adelia acuminata (swamp privet)	26		
Menyanthaceæ:			
Menyanthes trifoliata (bog bean)	6	4	
Asclepiadaceæ:			
Asclepias sp. (milkweed)	1		
Convolvulaceæ:			
Ipomœa sp. (morning-glory)	6		
Unidentified	12		
Cuscutaceæ:			
Cuscuta sp. (dodder)	10	4	2
Boraginaceæ:			
Heliotropium indicum (heliotrope)	104		3
Heliotropium sp. (heliotrope)	2		
Verbenaceæ:			
Verbena sp	2		
Lippia nodiflora		1	
Lippia sp	1		
Plantaginaceæ:			
Plantago rugelii (plantain)	1		
Rubiaceæ:			
Cephalanthus occidentalis (buttonbush)	428	8	7
Diodia virginiana (buttonweed)	11		
Diodia teres (buttonweed)	25		
Diodia sp. (buttonweed)	2		
Galium sp. (cleavers)	10	5	
Psychotria tenuifolia	1		
Caprifoliaceæ:			
Triosteum perfoliatum (feverwort)	1		
Symphoricarpos racemosus (snowberry)	2		
Symphoricarpos sp. (snowberry)	1		
Ambrosiaceæ:			
Ambrosia elatior (ragweed)	2	1	
Ambrosia trifida (ragweed)	4		
Ambrosia sp. (ragweed)	5		
Compositæ:			
Eupatorium sp	1		
Helianthus sp. (sunflower)	1		
Bidens bidentoides (Spanish needles)	1		
Bidens cernua (bur marigold)	1		
Bidens frondosa (Spanish needles)	1		
Bidens sp. (Spanish needles)	47	1	
Carduus sp. (thistle)	6	2	
Unidentified	2		

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found.*

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
SUBKINGDOM **CŒLENTERATA.**			
Alcyonaria (sea fans)	.....	3	.....
Hydrozoa (hydroid)	1	.....	.....
SUBKINGDOM **NEMATHELMINTHES.**			
Gordiidae (hairworm)	1	.....	.....
SUBKINGDOM **MOLLUSCOIDA.**			
Phylactolaemata (fresh-water bryozoa)	12	.....	.....
SUBKINGDOM **ECHINODERMATA.**			
Echinoidea (sea urchin)	.....	2	.....
SUBKINGDOM **ANNULATA.**			
Unidentified annelid	1	.....	.....
Lumbricomorpha (earthworm)	1	.....	.....
Nereis sp. (marine worm)	2	17	.....
SUBKINGDOM **ARTHROPODA.**			
CLASS **Crustacea** (CRUSTACEANS).			
Unidentified	3	15	.....
Order OSTRACODA.			
Bivalved crustacean, unidentified	2	.....	.....
Candona sp.	1	.....	.....
Order COPEPODA.			
Water fleas	2	.....	.....
Order CIRRIPEDIA (Barnacles).			
Balanus amphitrite	.....	1	.....
Chthamalus fragilis	.....	1	.....
Unidentified	.....	1	.....
Order AMPHIPODA.			
Unidentified	18	11	.....
Gammaridæ (sand-fleas).			
Gammarus annulatus	.....	2	.....
Gammarus locusta	1	1	.....
Gammarus marinus	.....	3	.....
Gammarus sp.	1	1	.....
Podoceridæ.			
Amphithöe rubricata	.....	1	.....
Grubia compta	.....	2	.....
Photidæ.			
Microdeutopus gryllotalpus	.....	1	.....
Orchestiidæ.			
Hyalella azteca	2	.....	.....
Hyalella dentata	.....	1	.....
Hyalella knickerbockeri	1	.....	.....
Orchestia grillus	.....	5	.....
Talitrus megalophthalmus	.....	1	.....

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Crustacea** (CRUSTACEANS)—Continued.			
Order ISOPODA.			
Unidentified	7	10	.....
Oniscidæ (sowbugs).			
Oniscus asellus	.....	1	.....
Unidentified	2	.....	.....
Asellidæ.			
Asellus sp.	.....	2	.....
Mancasellus sp.	2	.....	.....
Idotheidæ.			
Edotia triloba	.....	1	.....
Erichsonella attenuata	.....	2	.....
Idotea balthica	.....	9	.....
Idotea phosphorea	.....	3	.....
Order DECAPODA (Shrimps, Lobsters, Crabs, etc.).			
Suborder MACRURA (Shrimps, Lobsters, etc.).			
Unidentified	1	3	.....
Crangonidæ (sand shrimps).			
Crago septemspinosus	.....	2	.....
Palæmonidæ (fresh-water shrimps).			
Palæmonetes exilipes	4	4	.....
Palæmonetes vulgaris	1	1	.....
Palæmonetes sp.	1	.....	.....
Astacidæ (crawfishes).			
Cambarus angustatus	1	.....	.....
Cambarus clarkii	1	.....	.....
Cambarus fallax	1	.....	.....
Cambarus virilis	4	.....	.....
Unidentified	44	2	3
Suborder BRACHYURA (Crabs).			
Unidentified	9	16	1
Pilumnidæ (mud crabs).			
Neopanope texana sayi	.....	3*	.....
Hexapanopeus angustifrons	.....	4	.....
Portunidæ (green crabs).			
Carcinides mænas	.....	3	.....
Callinectes sapidus (edible crab)	.....	1	1
Ocypodidæ (fiddler crabs).			
Uca sp.	.....	1	.....
CLASS **Myriapoda.**			
Diplopoda (millipeds)	1	.....	.....
Chilopoda (centipedes)	7	.....	.....
CLASS **Insecta** (INSECTS).			
Superorder AMPHIBIOTICA (Damselflies and Dragonflies).			
Unidentified odonate nymphs and adults (few of latter)	144	15	12
Order ZYGOPTERA (Damselflies).			
Unidentified nymphs	6	4	.....
Agrionidæ	1	.....	.....
Enallagma sp.	7	.....	.....

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Insecta** (INSECTS)—Continued.			
Order ANISOPTERA (Dragonflies).			
Unidentified nymphs and adults	21	4	.....
Æschnidæ.			
Gomphinæ	2	.....	.....
Æshna californica	1	.....	.....
Æshna sp	1	.....	.....
Anax junius	3	1	.....
Dromogomphus sp	1	.....	.....
Libellulidæ.			
Macromia illinoensis	1	.....	.....
Pachydiplax longipennis	4	.....	.....
Tetragoneuria sp	5	.....	.....
Unidentified	7	.....	.....
Order AGNATHA (Mayflies).			
Unidentified mayflies and nymphs	6	.....	.....
Order DERMAPTERA (Earwigs).			
Anisolabis maritima	.....	1	.....
Order ORTHOPTERA (Grasshoppers, etc.).			
Unidentified Orthopera and eggs	20	1	.....
Tettigidæ.			
Nomotettix sp	1	.....	.....
Tettix ornatus	1	.....	.....
Unidentified	16	1	.....
Acridiidæ.			
Melanoplus bivittatus	1	.....	.....
Melanoplus sp	1	.....	.....
Schistocerca americana	1	.....	.....
Unidentified	6	.....	.....
Locustidæ (green grasshoppers)	5	.....	.....
Gryllidæ (crickets).			
Nemobius sp	3	1	.....
Order PALEOPTERA (Roaches).			
Unidentified roaches and eggs	5	.....	.....
Order MALLOPHAGA (Bird Lice).			
Unidentified	1	.....	.....
Order HETEROPTERA (True Bugs).			
Unidentified	27	2	.....
Corixidæ (water boatmen).			
Corixa abdominalis	1	.....	.....
Corixa harrisii	1	.....	.....
Unidentified	39	11	3
Notonectidæ (back-swimmers).			
Notonecta insulata	1	.....	.....
Notonecta sp	.....	1	.....
Plea striola	3	.....	.....
Nepidæ (water scorpions).			
Ranatra sp	1	.....	.....

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Insecta** (INSECTS)—Continued.			
Order HETEROPTERA (True Bugs)—Continued.			
Belostomatidæ (giant water bugs).			
Zaitha sp.	69	2	5
Unidentified	1	2	.....
Naucoridæ.			
Pelocoris femoratus	33	.....	10
Pelocoris sp.	104	3	.....
Reduviidæ (assassin bugs)	1	.....	.....
Gerridæ (water striders).			
Gerris marginatus	1	.....	.....
Gerris sp.	2	.....	.....
Unidentified	1	.....	.....
Saldidæ (shore bugs).			
Salda sp.	1	.....	.....
Veliidæ (water walkers).			
Mesovelia mulsanti	1	.....	.....
Metrobates hesperius	1	.....	.....
Microvelia sp.	1	.....	.....
Unidentified	2	.....	.....
Lygæidæ.			
Myodocha serripes	1	.....	.....
Coreidæ.			
Corizus sidæ	2	.....	.....
Leptoglossus phyllopus	1	.....	.....
Leptoglossus sp.	1	.....	.....
Metapodius terminalis	1	.....	.....
Pentatomidæ (stink bugs).			
Euschistus sp.	2	.....	.....
Nezara sp.	1	.....	.....
Unidentified	3	.....	.....
Scutelleridæ (shield bugs)	1	.....	.....
Cydnidæ.			
Geotomus robustus	1	.....	.....
Unidentified	2	.....	.....
Order HOMOPTERA.			
Membracidæ (tree hoppers).			
Atymna sp.	1	.....	.....
Ceresa sp.	1	.....	.....
Platycotis sagittata	1	.....	.....
Unidentified	1	.....	.....
Fulgoridæ	1	.....	.....
Delphacidæ	1	.....	.....
Jassidæ (leafhoppers)	2	.....	.....
Aphididæ (plant-lice)	2	.....	.....
Order MEGALOPTERA (Stoneflies).			
Chauliodes sp. (Dobson larvæ)	1	.....	.....
Corydalis sp. (Dobson larvæ)	1	.....	.....
Order PHRYGANOIDEA (Caddisflies).			
Molanna sp.	2	1	.....
Unidentified caddisflies and larvæ	32	13	2

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Insecta** (INSECTS)—Continued.			
Order LEPIDOPTERA (Butterflies and Moths).			
Ceratocampidæ.			
Anisota sp. (pupæ of oak caterpillars)	10	.....	.....
Noctuidæ (cutworms)	2	1	.....
Pyralidæ	3	.....	.....
Tineidæ	.....	3	.....
Unidentified moths	2	.....	.....
Unidentified cocoons	20	.....	.....
Unidentified chrysalids	9	.....	.....
Unidentified caterpillars	12	3	.....
Order COLEOPTERA (Beetles).			
Unidentified beetles	135	.....	.....
Cicindelidæ (tiger beetles)	1	.....	.....
Carabidæ (ground beetles).			
Anomoglossus pusillus	1	.....	.....
Bembidium nigripes	1	.....	.....
Bembidium versicolor	.....	.....	1
Bembidium sp	3	.....	.....
Clivina bipustulata	1	.....	.....
Dyschirius sp	1	.....	.....
Galerita sp	1	.....	.....
Harpalus autumnalis	1	.....	.....
Lebia analis	1	.....	.....
Lebia ornata	1	.....	.....
Lebia sp	1	.....	.....
Loxandrus velox	1	.....	.....
Oodes fluvialis	1	.....	.....
Platynus striatopunctatus	1	.....	.....
Scarites subterraneus	10	.....	1
Scarites sp	3	.....	.....
Unidentified	18	5	.....
Haliplidæ (crawling water beetles).			
Haliplus punctatus	2	.....	.....
Haliplus triopsis	1	1	1
Haliplus sp	3	2	.....
Peltodytes pedunculatus	4	.....	.....
Peltodytes sp	4	.....	.....
Unidentified	7	.....	.....
Dytiscidæ (predacious diving beetles).			
Acilius fraternus	1	.....	.....
Agabus punctulatus	1	.....	.....
Canthydrus bicolor	17	.....	.....
Canthydrus puncticollis	1	.....	.....
Canthydrus unicolor	1	.....	.....
Canthydrus sp	1	.....	.....
Celina grossula	5	.....	.....
Cœlambus sp	1	.....	.....
Colpius inflatus	2	.....	.....
Colymbetes sp	2	.....	.....
Copelatus glyphicus	3	1	.....
Coptotomus interrogatus	3	.....	1

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Insecta** (INSECTS)—Continued.			
Order COLEOPTERA (Beetles)—Continued.			
Dytiscidæ (predacious diving beetles)—Continued.			
Coptotomus sp	2	.....	.....
Dytiscus verticalis	1	.....	.....
Hydrocanthus iricolor	10	1	1
Hydroporus modestus	.....	.....	1
Hydroporus tenebrosus	1	.....	.....
Hydroporus sp	1	1	.....
Hydrovatus compressus	16	.....	.....
Hydrovatus obesus	21	.....	.....
Hydrovatus sp	8	.....	.....
Laccophilus decipiens	1	.....	.....
Laccophilus maculosus	1	.....	.....
Laccophilus proximus	1	.....	.....
Unidentified	24	7	1
Gyrinidæ (whirligig beetles).			
Dineutes emarginatus	1	.....	.....
Dineutes sp	3	.....	.....
Gyrinus analis	1	.....	.....
Gyrinus elevatus	1	.....	.....
Gyrinus sp	2	1	.....
Hydrophilidæ (water scavenger beetles).			
Berosus striatus	1	.....	.....
Berosus sp	10	4	2
Cercyon sp	3	.....	.....
Cymbiodyta lacustris ?	.....	1	.....
Derallus altus	1	1	.....
Helopeltis larvalis	1	.....	.....
Helophorus sp	6	.....	.....
Hydrophilus triangularis	2	.....	.....
Hydrophilus sp	18	3	.....
Philhydrus cinctus	1	.....	.....
Tropisternus nimbatus	2	1	4
Tropisternus sp	15	.....	2
Unidentified	10	8	2
Silphidæ (carrion beetles).			
Necrophorus pustulatus	1	.....	.....
Staphylinidæ.			
Cafius bistriatus	.....	1	.....
Lathrobium longiuscula	2	.....	.....
Philonthus lomatus	1	.....	.....
Unidentified	5	.....	.....
Scaphidiidæ (shining fungus beetles).			
Scaphidium quadriguttatum	1	.....	.....
Erotylidæ (banded fungus beetles).			
Ischyrus quadripunctatus	1	.....	.....
Megalodacne fasciata	.....	1	.....
Histeridæ (shining carrion beetles).			
Hister dispar	1	.....	.....
Hister vernus	1	.....	.....

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **INSECTA** (INSECTS)—Continued.			
Order COLEOPTERA (Beetles)—Continued.			
Parnidæ.			
Elmis vittatus		1	
Pelonomus obscurus	1		
Heteroceridæ (mud beetles).			
Heterocerus brunneus	2		
Heterocerus collaris	1		
Heterocerus tristis	1		
Elateridæ (click beetles).			
Drasterius elegans	1		
Drasterius sp.	1		
Unidentified	1		
Lucanidæ (stag beetles).			
Passalus cornutus	1		
Passalus sp.	13		
Scarabæidæ (leaf chafers).			
Atænius cognatus	4		
Atænius strigatus	6		
Atænius sp.	2		
Aphodius sp.	8		
Canthon sp.	3		
Chalepus trachypygus	1		
Cłœotus globosus	1		
Onthophagus hecate	1		
Onthophagus pennsylvanicus	1		
Onthophagus sp.	2		
Phanæus carnifex	1		
Phyllophaga sp.	1		
Unidentified	10		
Chrysomelidæ (leaf beetles).			
Cerotoma caminea	3		
Donacia sp.	1	1	
Haltica rufa	1		
Myochrous denticollis	3		
Œdionychis concinna	1		
Œdionychis scalaris	1		
Systena hudsonias	1		
Typophorus canellus	1		
Unidentified	5		
Tenebrionidæ.			
Anædus brunneus	1		
Blapstinus sp.	3		
Opatrinus notus	1		
Tribolium ferrugineum	1		
Unidentified	2		
Anthicidæ (flower beetles).			
Anthicus sp.	1		
Tomoderus interruptus	2		

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Insecta** (INSECTS)—Continued.			
Suborder RHYNCHOPHORA (Weevils).			
Unidentified	18	7	.....
Otiorhynchidæ.			
Eudiagogus sp	1	.....	.....
Otiorhynchus ovatus	.....	1	.....
Curculionidæ (snout beetles).			
Unidentified	1	.....	.....
Conotrachelus affinis	1	.....	.....
Conotrachelus erinaceus	1	.....	.....
Conotrachelus sp	1	.....	.....
Lissorhoptrus simplex	18	2	.....
Lissorhoptrus sp	4	.....	.....
Listronotus frontalis	1	.....	.....
Pachylobius picivorus	1	.....	.....
Sitones hispidulus	.....	1	.....
Tylopterus pallidus	2	.....	.....
Calandridæ (billbugs).			
Sphenophorus sp	8	2	1
Scolytidæ (barkbeetles)	1	.....	.....
Anthribidæ.			
Cratoparis lunatus	1	.....	.....
Order DIPTERA (Flies).			
Unidentified adults	1	3	.....
Unidentified larvæ	14	4	.....
Unidentified pupæ	55	3	1
Tipulidæ (craneflies).			
Unidentified eggs, larvæ, pupæ, and adults	4	3	.....
Chironomidæ (midges).			
Ceratopogon sp	1	.....	.....
Unidentified midges and larvæ	28	6	.....
Culicidæ (mosquitoes).			
Culex restuans	1	.....	.....
Dixidæ.			
Dixa sp	1	.....	.....
Psychodidæ (mothflies)	1	.....	.....
Cecidomyiidæ (gall midges)	1	.....	.....
Stratiomyiidæ (soldierflies).			
Odontomyia sp	1	.....	.....
Unidentified larvæ	24	.....	1
Tabanidæ (horseflies).			
Tabanus sp	2	.....	1
Unidentified larvæ	7	1	1
Dolichopodidæ	1	1	.....
Phoridæ	1	.....	.....
Syrphidæ (flowerflies).			
Syrphus sp	1	.....	.....
Unidentified larvæ and pupæ	15	3	.....
Ephydridæ.			
Unidentified pupæ and adults	5	2	.....
Hippoboscidæ (birdflies)	.....	1	.....

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Insecta** (INSECTS)—Continued.			
Order HYMENOPTERA (Ants, Bees, and Wasps).			
Unidentified	5	3	.....
Apoidea (bees)	1	.....	.....
Vespoidea (wasps)	5	.....	.....
Chrysidoidea (cuckoo wasps)	1	.....	.....
Ichneumonoidea (parasitic wasps).			
Hemiteles sp	1	.....	.....
Phægogenes sp	1	.....	.....
Formicoidea (ants).			
Unidentified	33	4	.....
Formicidæ.			
Camponotus sp	1	.....	.....
Formica sp	2	.....	.....
Pheidole dentata	1	.....	.....
Ponera opaciceps	1	.....	.....
Unidentified	2	.....	.....
Tenthredinoidea (sawflies)	3	.....	.....
CLASS **Arachnida.**			
Order ARANEIDA (Spiders).			
Unidentified spiders and cocoons	27	2	.....
Schizogyna sp	.....	1	.....
Order ACARIDA (Mites).			
Hydrachnidæ (water mites)	14	1	.....
Oribatidæ	1	.....	.....
SUBKINGDOM **Mollusca** [1] (MOLLUSKS).			
Unidentified	20	31	.....
CLASS **Gastropoda** (UNIVALVES).			
Unidentified	561	71	18
Muricidæ.			
Nucella lapillus	.....	1	.....
Urosalpinx cinereus	.....	1	.....
Nassidæ.			
Ilyanassa obsoleta	.....	8	1
Nassa acuta	1	.....	.....
Nassa ambigua	1	.....	.....
Nassa sp	.....	6	.....
Columbellidæ.			
Anachis avara	.....	4	.....
Anachis obesa	4	4	.....
Astyris lunata	3	7	.....
Pleurotomidæ.			
Clathurella jewetti	.....	1	.....
Mangilia stellata	.....	1	.....
Mangilia sp	1	.....	.....

[1] Besides the species here listed for the southern black duck, Mr. F. C. Baker (O. & O. 14, p. 139, and Proc. Acad. Nat. Sci. Philadelphia, 1889, p. 267) adds the following: *Cylichna oriza, Utriculus canaliculatus, Truncatella subcylindrica,* and *Odostomia impressa.*

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Gastropoda** (UNIVALVES)—Continued.			
Calyptræidæ.			
Crepidula convexa		1	
Crepidula fornicata		1	
Pyramidellidæ.			
Odostomia impressa		1	
Odostomia menestho trifida		1	
Odostomia sp		1	
Turbonilla sp		1	
Litorinidæ.			
Lacuna vincta		2	
Lacuna sp		6	
Litorina grönlandica		1	
Litorina irrrorata		2	
Litorina litorea	1	22	
Litorina palliata		16	
Litorina rudis		38	
Litorina sp	1	5	
Modulidæ.			
Modulus modulus	1		
Cerithiidæ.			
Bittium nigrum		3	
Bittium sp		1	
Rissoidæ.			
Paludinella salsa		1	
Amnicolidæ.			
Amnicola limosa			1
Amnicola olivacea	1		
Amnicola parva	1		
Amnicola peracuta	8		
Amnicola porata	1		
Amnicola sp	6	3	3
Paludestrina sp	3		
Valvatidæ.			
Valvata sincera	4		
Valvata tricarinata	2		
Valvata virens	5		
Valvata sp	1		
Viviparidæ.			
Vivipara intertexta	5		
Campeloma indecisa	1		
Campeloma sp		1	
Ampullariidæ.			
Ampullaria sp	3		
Neritidæ.			
Neritina reclivata	35		
Neritina virginica	3	2	
Trochidæ.			
Margarites helicinus		1	

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Gastropoda** (UNIVALVES)—Continued.			
Triforidæ.			
Triforis sp		1	
Cylichnidæ.			
Cylichna canaliculata		1	
Zonitidæ.			
Vitrea sp	1		
Helicidæ.			
Polygyra espiloca	1		
Polygyra sp	3		
Pupidæ.			
Vertigo sp	1		
Succineidæ.			
Succinea avara		1	
Auriculidæ.			
Melampus bidentatus		2	
Lymnæidæ.			
Lymnæa columella	1		
Lymnæa palustris	3		
Lymnæa techella		1	
Lymnæa truncatua	1		
Lymnæa sp	6	1	
Planorbis alabamensis	1		
Planorbis campanulatus	1	1	
Planorbis dilatatus	1		
Planorbis duryi			4
Planorbis exacuous	1		
Planorbis hirsutus	1		
Planorbis opercularis	2		
Planorbis parvus	8		
Planorbis trivolvis	13		7
Planorbis vermicularis	1		
Planorbis wheatleyi	1		
Planorbis sp	15	1	
Pompholyx costata	1		
Segmentina armigera	4		
Segmentina obstricta	1		
Physidæ.			
Physa ancillaria	1		
Physa heterostropha	15	1	
Physa sp	24	2	2
CLASS **Pelecypoda** (BIVALVES).			
Unidentified	16	9	1
Myidæ.			
Mya arenaria (soft-shell clam)		1	
Mactridæ.			
Mulinia lateralis			1
Rangia cuneata	1		
Tellinidæ.			
Macomia fusca		1	

TABLE II.—*Items of animal food identified in stomachs of mallard ducks and the number in which found*—Continued.

Kind of food.	Common mallard.	Black duck.	Southern black duck.
Total number of stomachs examined	1,725	622	51
CLASS **Pelecypoda** (BIVALVES)—Continued.			
Veneridæ.			
Gemma gemma	1	2	.....
Gemma purpurea	.....	1	.....
Paphia staminea	1	.....	.....
Sphæriidæ.			
Corneocyclas abdita	3	2	.....
Corneocyclas milium	1	.....	.....
Corneocyclas splendidula	1	.....	.....
Corneocyclas variabile	1	.....	.....
Corneocyclas vesiculare	1	.....	.....
Corneocyclas virginicum ?	.....	2	.....
Corneocyclas sp	6	.....	.....
Sphærium partumeium	2	.....	.....
Sphærium sp	4	.....	.....
Cardiidæ.			
Cardium grönlandicum	.....	1	.....
Unionidæ.			
Unio sp	1	.....	.....
Nuculidæ.			
Nucula delphinodonta	.....	1	.....
Nucula proxima	.....	1	.....
Mytilidæ.			
Mytilus edulis (common mussel)	1	35	.....
Modiola plicatula	.....	3	.....
SUBKINGDOM **CHORDATA** (VERTEBRATES).			
CLASS **Pisces** (FISHES).			
Unidentified	36	18	3
Anguillidæ (eels).			
Anguilla chrysypa	.....	1	.....
Pœciliidæ (killifishes).			
Fundulus sp	.....	2	.....
Cyprinodontidæ (top minnows).			
Cyprinodon variegatus	3	.....	.....
CLASS **Amphibia** (FROGS, TOADS, AND SALAMANDERS).			
Ranidæ (frogs)	19	1	.....
CLASS **Mammalia** (MAMMALS).			
Bit of mammal bone	.....	1	.....

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